



PIER Energy System Integration Program Area

Flexible AC Transmission Systems - Target 38A

Contract #: 500-00-023 **Project #:** 16

Contractor: Electric Power Research Institute (EPRI)

Subcontractors: Siemens Power Transmission & Distribution

Project Amount: \$62,500

Match Amount: \$274,237

Contractor Project Manager: Aty Edris (650) 855-2311

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Status: Completed

Project Description:

The purpose of this project is to demonstrate an advanced controller technology with the potential—if it were applied—to substantially increase power transfer capability on the transmission grid in California and the western region. The Convertible Static Compensator (CSC) is the latest FACTS (Flexible Alternating Current Transmission System) Controller developed under EPRI's FACTS technology development and application program. The CSC is an innovative power electronics-based controller that provides multiple compensating modes, which are needed to securely increase power transfer capability limits of existing transmission systems. The Controller provides flexible dynamic voltage control (to avoid voltage instability), as well as simultaneous real and reactive power flow control on multiple transmission corridors (without risk of transient or dynamic instability). The CSC offers this flexibility by allowing its converters to be connected in shunt, in series, in shunt/series, or in series/series with two lines.

This EPRI project supports demonstration of the world's first CSC—two 100-MVA Voltage Source Converters—which has been installed and is in operation at New York Power Authority's (NYPA) Marcy Substation in Utica, New York. The CSC is enabling NYPA to mine 240 more MW of power from the grid precisely when they need it most—during contingency situations. Membership in this project provides the Energy Commission with key technical information on installation and operation of the CSC, and integration of the CSC in a power grid.

This project supports the PIER Program objectives of:

- Improving the reliability/quality of California's electricity through innovative technologies, which help to balance the competing needs of maximizing the use of the grid while maintaining the security of the system.
- Improving the safety/security of California's electricity system by developing technologies to maintain and enhance system security in the face of increasing traffic and congestion, while avoiding the environmental impacts associated with new transmission lines and corridors.

Proposed Outcomes:

1. Install CSC voltage source converters for shunt and series compensation.
2. Conduct initial field tests.

Actual Outcomes:

1. Phase 1 of the project (Static Synchronous Compensator [STATCOM] operation) was successfully commissioned in June this year.
2. CSC in the shunt operation modes (+/-200 Mvar STATCOM) is now in service, and is being monitored for fine-tuning the control and protection system.
3. A dedication ceremony was held June 21 to mark the startup of the first phase of the CSC.
4. A technical progress report Convertible Static Compensator (CSC) for New York Power Authority, EPRI no. 1001970, was published.
5. A review of the CSC operation was presented at the FACTS Users Group Meeting on October 18-19, 2001 in New York City.
6. An EPRI "Innovators" document, quantifying the benefits of the CSC, is currently under development and will be published by the end of December 2001 or early January 2002.
7. Work is under way on the series operation modes—Static Synchronous Compensator, Unified Power Flow Controller, and Interline Power Flow Controller.
8. Installation of two bypass switches is under way.

Project Status:

The project has been completed.